

**CLAIM AMENDMENTS**

1-60 (canceled)

61. (previously presented): A method of recommending items to users from a database of items, the method comprising:

maintaining item selection histories of each of a plurality of users of a server system that provides functionality for browsing and selecting items from an electronic catalog of items, each item selection history corresponding to, and identifying items selected by, a particular user;

collectively analyzing at least the item selection histories of the plurality of users, as collected over a period of time, in an off-line processing mode to generate a plurality of data values that represent degrees to which specific items in the electronic catalog are related;

storing a selected subset of the plurality of data values in a mapping structure that maps items to related items; and

for each of a plurality of users of the electronic catalog, using the mapping structure, including the data values stored therein, to generate personalized recommendations of items within the catalog.

62. (previously presented): The method of Claim 61, wherein the personalized recommendations are generated substantially in real time.

63. (previously presented): The method of Claim 61, wherein the mapping structure is a B-tree data structure.

64. (previously presented): The method of Claim 63, wherein the B-tree data structure includes the data values of selected pairs of related items.

65. (previously presented): The method of Claim 61, further comprising replicating the mapping structure, together with associated executable code used to generate personalized recommendations, across multiple machines of said server system to improve real time performance.

66. (previously presented): The method of Claim 61, wherein storing a selected subset of the plurality of data values comprises using the data values to identify items that are sufficiently related to be mapped within the mapping structure.

**Appl. No.** : 09/850,263  
**Filed** : May 7, 2001

67. (previously presented): The method of Claim 61, wherein collectively analyzing the item selection histories comprises generating a data value that indicates a degree to which a first item and a second item are related, wherein the data value is dependent upon at least (a) a number of users that selected both the first item and the second item, (b) a total number of users that selected the first item, and (c) a total number of users that selected the second item.

68. (previously presented): The method of Claim 67, wherein the data value is generated substantially according to the equation  $X / (\text{SQRT}(Y \times Z))$ , where X is the number of users that selected both the first item and the second item, Y is the total number of users that selected the first item, and Z is the total number of users that selected the second item.

69. (previously presented): The method of Claim 61, wherein collectively analyzing the item selection histories comprises generating a data value that indicates a degree to which a first item and a second item are related, wherein the data value is dependent upon at least (a) a number of users that purchased both the first item and the second item, (b) a total number of users that purchased the first item, and (c) a total number of users that purchased the second item.

70. (previously presented): The method of Claim 61, further comprising repeating the step of collectively analyzing the item selection histories periodically using a most recent set of item selection history data.

71. (previously presented): The method of Claim 61, wherein each item selection history is a history of items selected for purchase by a user.

72. (previously presented): The method of Claim 61, wherein each item selection history is a history of items selected for viewing by a user.

73. (previously presented): The method of Claim 61, wherein generating personalized recommendations comprises identifying a plurality of items selected by a target user to which personalized recommendations are to be provided, and using the mapping structure and data values stored therein to select, in real time, a set of additional items that are collectively related to the plurality of items.

74. (previously presented): The method of Claim 73, wherein identifying a plurality of items selected by a target user comprises identifying items currently in an electronic shopping cart of the target user.

**Appl. No.** : **09/850,263**  
**Filed** : **May 7, 2001**

75. (previously presented): The method of Claim 74, further comprising displaying at least some of the additional items on a shopping cart page that displays current contents of the electronic shopping cart, such that the shopping cart page suggests additional items that may be of interest to the target user.

76. (previously presented): The method of Claim 61, wherein generating personalized recommendations comprises identifying a plurality of items purchased by a target user, and using the mapping structure to select, in real time, a set of additional items that are collectively related to the plurality of items.

77. (previously presented): The method of Claim 61, wherein generating personalized recommendations comprises identifying a set of items that have been viewed by a target user during browsing of the electronic catalog, and using the mapping structure to select, in real time, a set of additional items that are collectively related to the set of viewed items.

78. (previously presented): The method of Claim 61, wherein the personalized recommendations are generated and provided to a target user without requiring the target user to explicitly rate items or to create an input list of items.

79. (previously presented): The method of Claim 61, wherein the personalized recommendations are generated and provided to a target user without requiring the target user to explicitly request recommendations.

80. (previously presented): The method of Claim 61, wherein the personalized recommendations are generated and provided to a target user without requesting preference information from the target user.

81. (previously presented): The method of Claim 61, wherein the personalized recommendations are generated for and provided to each of the plurality of users without updating the mapping structure.

82. (canceled)

Appl. No. : 09/850,263  
Filed : May 7, 2001

83. (previously presented): A computer-implemented method of generating a mapping of items to related items, the method comprising:

maintaining item selection histories of each of a plurality of users of a server system that provides functionality for browsing and selecting items from an electronic catalog of items, each item selection history corresponding to, and identifying items selected by, a particular user;

collectively and programmatically analyzing the item selection histories of the plurality of users to generate a data value that represents a degree to which a first item and a second item in the catalog are related, wherein the data value is dependent upon at least (a) a number of users that selected both the first item and the second item, (b) a total number of users that selected the first item, and (c) a total number of users that selected the second item; and

using the data value to determine whether the first item should be mapped to the second item in a mapping structure that maps items to related items.

84. (previously presented): The method of Claim 83, wherein the data value is generated according to the equation  $X / (\text{SQRT}(Y \times Z))$ , where X is the number of users that selected both the first item and the second item, Y is the total number of users that selected the first item, and Z is the total number of users that selected the second item.

85. (previously presented): The method of Claim 83, wherein the item selection histories identify items selected for purchase by the users, and the data value is dependent upon at least (a) a number of users that purchased both the first item and the second item, (b) a total number of users that purchased the first item, and (c) a total number of users that purchased the second item.

86. (previously presented): The method of Claim 83, further comprising determining whether a given item should be recommended to a user based at least in part on a degree to which the given item is related to each of multiple items known to be of interest to the user, as indicated by the mapping structure.

87-96 (canceled)

97. (currently amended): A computer-implemented method of recommending items to users of a server system that provides functionality for selecting items represented in an electronic catalog, the method comprising:

identifying a plurality of items that are currently selected by a target user to obtain from an online business entity, including multiple items currently represented in a user-specific data repository in which item selections are maintained persistently over multiple sessions;

identifying a set of additional items to recommend to the target user according to a selection algorithm in which a candidate item is considered for inclusion in the set based at least in-part upon a degree to which the candidate item is related to each of said plurality of items currently selected by the target user to obtain; and

recommending at least some of the additional items in the set to the target user while the plurality of items are selected by the target user to obtain.

98. (previously presented): The method of Claim 97, wherein the method is performed substantially in real time when the target user accesses an electronic shopping cart in which said plurality of items are represented.

99. (previously presented): The method of Claim 97, wherein the degree to which the candidate item is related to each of the plurality of items is based at least in part on results of a programmatic correlation analysis of purchase histories of a plurality of users.

100. (previously presented): The method of Claim 97, wherein the degree to which the candidate item is related to each of the plurality of items is based at least in part on results of a programmatic correlation analysis of item viewing histories of a plurality of users.

101. (previously presented): The method of Claim 97, wherein the set of additional items is identified at least in part by retrieving, from a B-tree data structure, a related items list for each of the plurality of items.

102. (previously presented): The method of Claim 97, wherein recommending at least some of the additional items to the target user comprises displaying representations of the additional items on a web page that displays a representation of said plurality of items.

**Appl. No.** : **09/850,263**  
**Filed** : **May 7, 2001**

103. (previously presented): The method of Claim 97, wherein recommending at least some of the additional items to the target user comprises filtering out additional items that are included within a purchase history of the target user.

104. (previously presented): The method of Claim 97, wherein identifying a plurality of items that are currently selected comprises identifying a plurality of items represented in an electronic shopping cart associated with the target user.

105. (canceled)

106. (previously presented): The method of Claim 97, wherein identifying a plurality of items that are currently selected comprises identifying items currently selected by the target user to purchase.

107. (previously presented): The method of Claim 97, wherein identifying a plurality of items that are currently selected comprises identifying items currently selected for delivery to the target user.

108. (previously presented): The method of Claim 97, wherein the items are physical products.

109. (previously presented): The method of Claim 97, wherein the items include at least one of (a) an audio-visual work and (b) a video title.

110. (previously presented): The method of Claim 97, wherein the degree to which the candidate item is related to each of the plurality of items is based, at least in part, on results of an off-line correlation analysis of item selection histories of a plurality of users.

111. (previously presented): The method of Claim 61, wherein maintaining item selection histories comprises maintaining an item selection history reflective of items selected by a user over multiple days.

112. (previously presented): The method of Claim 61, wherein maintaining item selection histories comprises maintaining an item selection history reflective of actions performed by a user over multiple days.

113. (previously presented): The method of Claim 61, wherein each item selection history comprises data indicative of a date that an item was selected by a corresponding user.

114. (currently amended): A data mining method, comprising:

programmatically analyzing user activity data associated with a plurality of users of an electronic catalog, in an off-line processing mode, to generate data values representing degrees to which specific catalog items are related to one another, said user activity data reflecting user interest in specific catalog items;

using the data values to select, for each of a plurality of the catalog items, a corresponding set of related catalog items;

generating mappings of said plurality of catalog items to the corresponding sets of related catalog items, wherein generating the mappings comprises storing selected ones of said data values, together with associated item identifiers, in a mapping data structure;  
and

programmatically generating personalized item recommendations for each of a plurality of target users of the electronic catalog using said data values stored in the mapping data structure and using said mappings, wherein the personalized item recommendations are generated for each of the plurality of target users without updating the mapping data structure.

115-117. (canceled)

118. (previously presented): The method of Claim 114, wherein programmatically analyzing the user activity data comprises determining, for a selected pair of catalog items, how many users that purchased the first item of the pair also purchased the second item of the pair.

119. (previously presented): The method of Claim 114, wherein programmatically analyzing the user activity data comprises analyzing item viewing activities of users.

120. (previously presented): The method of Claim 114, wherein programmatically analyzing the user activity data comprises analyzing shopping cart activities of users.

121. (previously presented): The method of Claim 114, wherein programmatically generating personalized item recommendations comprises using the mappings to select catalog items that are related to a plurality of catalog items previously purchased by a target user, as determined from a purchase history of the target user.

Appl. No. : 09/850,263  
Filed : May 7, 2001

122. (currently amended): ~~The method of Claim 114,~~ A data mining method, comprising:  
programmatically analyzing user activity data associated with a plurality of users  
of an electronic catalog, in an off-line processing mode, to generate data values  
representing degrees to which specific catalog items are related to one another, said user  
activity data reflecting user interest in specific catalog items;

using the data values to select, for each of a plurality of the catalog items, a  
corresponding set of related catalog items;

generating mappings of said plurality of catalog items to the corresponding sets of  
related catalog items; and

programmatically generating personalized item recommendations for each of a  
plurality of users of the electronic catalog using said mappings;

wherein programmatically generating personalized item recommendations  
comprises using the mappings, in combination with an item ratings profile of a target  
user, to select catalog items to recommend to the target user, wherein the item ratings  
profile comprises scores explicitly assigned to specific items by the target user.

123. (previously presented): The method of Claim 114, wherein programmatically  
generating personalized item recommendations comprises using the mappings to select catalog  
items that are related to a plurality of catalog items previously viewed by a target user.

124. (currently amended): ~~The method of Claim 114,~~ A data mining method, comprising:  
programmatically analyzing user activity data associated with a plurality of users  
of an electronic catalog, in an off-line processing mode, to generate data values  
representing degrees to which specific catalog items are related to one another, said user  
activity data reflecting user interest in specific catalog items;

using the data values to select, for each of a plurality of the catalog items, a  
corresponding set of related catalog items;

generating mappings of said plurality of catalog items to the corresponding sets of  
related catalog items; and

programmatically generating personalized item recommendations for each of a  
plurality of users of the electronic catalog using said mappings;



**Appl. No.** : **09/850,263**  
**Filed** : **May 7, 2001**

wherein programmatically generating personalized item recommendations comprises using the mappings to select catalog items that are related to a plurality of catalog items currently represented in a user-specific data repository in which item selections are maintained persistently over multiple sessions.

125. (previously presented): The method of Claim 114, wherein programmatically generating personalized item recommendations comprises using the mappings to select catalog items that are related to a plurality of catalog items currently selected by a target user to obtain from an online business entity.

126. (previously presented): The method of Claim 114, wherein the items include video titles.

127. (previously presented): The method of Claim 114, wherein the data values are based on at least one type of item selection activity performed by users for purposes other than to obtain recommendations.